

ABSTRAK

HUBUNGAN *EL NINO SOUTHERN OSCILLATION* (ENSO) DAN *INDIAN OCEAN DIPOLE MODE* (IODM) TERHADAP VARIABILITAS SUHU PERMUKAAN LAUT DAN KLOOROFIL-A DI PERAIRAN BARAT SUMATERA

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Interaksi atmosfer dan lautan di Samudera Pasifik menyebabkan fenomena El Nino South Oscillation, sedangkan di Samudera Hindia menyebabkan fenomena Indian Ocean Dipole Mode. Penelitian ini bertujuan untuk mempelajari hubungan antara ENSO dan IODM terhadap variabilitas SPL dan klorofil-a di perairan Sumatera bagian barat. Penelitian ini menggunakan metode kuantitatif. Data yang digunakan dalam penelitian ini adalah indeks ONI, indeks DM, SPL, dan klorofil-a selama periode waktu 2011-2020. Hubungan pola sebaran spasial antara SPL dan klorofil-a dianalisis menggunakan analisis korelasi spasial. Variabilitas pola SPL dan klorofil-a akibat pengaruh osilasi indeks Nino 3.4 dan DMI dianalisis menggunakan metode continuous wavelet transform (CWT), sedangkan fase dan periode kejadian dianalisis menggunakan metode cross wavelet transform (XWT). Hasil penelitian menunjukkan bahwa variabilitas temporal SPL tertinggi terjadi pada musim peralihan pertama, sedangkan SPL terendah terjadi pada musim barat. Keanekaragaman klorofil-a secara temporal relatif sama meningkat setiap tahunnya pada musim peralihan pertama ke musim timur. Hubungan SPL dengan klorofil-a menunjukkan korelasi positif yang kuat pada tahun 2011 hingga 2020 kecuali pada tahun 2019 di perairan Aceh hingga Padang, sedangkan korelasi negatif terjadi pada tahun 2019 di perairan Sumatera bagian barat. Hasil CWT menunjukkan adanya variabilitas bulanan dan tahunan. Hasil XWT menunjukkan bahwa fenomena El Nino mendahului fenomena IOD positif pada periode 16 hingga 32 dan berkorelasi dengan variabilitas SPL dan klorofil-a.

Kata kunci: ENSO, IODM, suhu permukaan laut, klorofil-a, wavelet, variabilitas

ABSTRACT

THE RELATIONSHIP OF EL NINO SOUTHERN OSCILLATION (ENSO) AND INDIAN OCEAN DIPOLE MODE (IODM) TO VARIABILITY OF SEA SURFACE TEMPERATURE AND CHLOROPHYLL-A IN THE WATERS OF WESTERN SUMATRA

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The interaction between the atmosphere and ocean in the Pacific Ocean caused the El Nino South Oscillation phenomenon, while in the Indian Ocean, it caused the Indian Ocean Dipole Mode phenomenon. This research aimed to determine the relationship between ENSO and IODM on the variability of SST and chlorophyll-a in the waters of western Sumatera. This research used a quantitative method. The data used in this research were ONI index, DM index, SST, and chlorophyll-a during the 2011-2020 time period. The relation between spatial distribution patterns between SST and chlorophyll-a was analyzed using spatial correlation analysis. Variability patterns in SST and chlorophyll-a due to the influence of oscillation of the Nino 3.4 index and DMI were analyzed using the continuous wavelet transform (CWT) method, while the phases and periods of events were analyzed using the cross wavelet transform (XWT) method. The research result showed that the highest temporal SST occurred in the first transition season, while the lowest SST occurs in the west season. Temporal diversity of chlorophyll-a relatively similar and increased every year in the first transition season to the east monsoon. The relationship between SST and chlorophyll-a showed a strong positive correlation from 2011 to 2020, except in 2019 in the waters of Aceh to Padang, while a negative correlation occurred in 2019 in the waters of western Sumatra. The CWT results showed that there was monthly and annual variability. The XWT results showed that the El Nino phenomenon preceded the positive IOD phenomenon in the periods 16 to 32 and was correlated with SST and chlorophyll-a variability.

Keywords: ENSO, IODM, sea surface temperature, chlorophyll-a, wavelet, variability